

MAGNOBATES (ACARIDA: CRYPTOSTIGMATA: HAPLOZETIDAE) FROM SOUTH AUSTRALIAN SOILS

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Summary

LEE, D. C. & SHEPHERD, K. J. (1990) *Magnobates* (Acarida: Cryptostigmata: Haplozetidae) from South Australian soils. *Trans. R. Soc. S. Aust.* 114(4), 179-186, 30 November, 1990.

Magnobates Hammer, 1967 is redefined to include two species previously grouped in *Lauritzenia* Hammer, 1958. Two new species, from soil and litter in savannah woodland and sclerophyll forest, are described: *M. elongatus* sp. nov., *M. globulus* sp. nov. They do not occur in drier South Australian sites. Relationships between some genera of Haplozetidae Grandjean, 1936 are discussed. A key to adults is given for the five species of *Magnobates*; this is its first record from Australia.

KEY WORDS: *Magnobates elongatus* sp. nov., *M. globulus* sp. nov., *Lauritzenia* Hammer, Haplozetidae, Acarida, soils, South Australia.

Introduction

The genus *Magnobates* Hammer, 1967 is examined as part of an ongoing study of sarcoptiform mites in South Australian soils, sampled from nine florally diverse sites. An introduction to the relevant work on the advanced oribatid mites (Planofissurae) is provided by Lee (1987).

Magnobates appears to be closely allied to *Haplozetes* Willmann, 1935 and *Lauritzenia* Hammer, 1958 in the Haplozetidae Grandjean, 1936. Examination of the holotypes of the type-species of *Magnobates* and *Lauritzenia*, and consideration of the thorough redescription of the type-species of *Haplozetes* (*H. vindohonensis* Willmann, 1935) by Grandjean, 1936, substantiates this relationship. The delineation of *Magnobates* from *Lauritzenia* is considered, resulting in two species being newly combined with *Magnobates*. New species are recognised and described from the South Australian material.

Materials and Methods

New material examined here, collected by D.C.L., is mainly deposited in the South Australian Museum (SAMA), but also in the Natural History Museum, London (BMNH), the Field Museum, Chicago (FMNH) and the New Zealand Arthropod Collection, D.S.I.R., Auckland (NZAC). Established types examined are deposited in the Zoological Museum, Copenhagen.

No new notational systems are introduced. All measurements are in micrometres (μm) and were

made using an eyepiece micrometer at $\times 250$ magnification.

Systematics

Family: Haplozetidae Grandjean, 1936

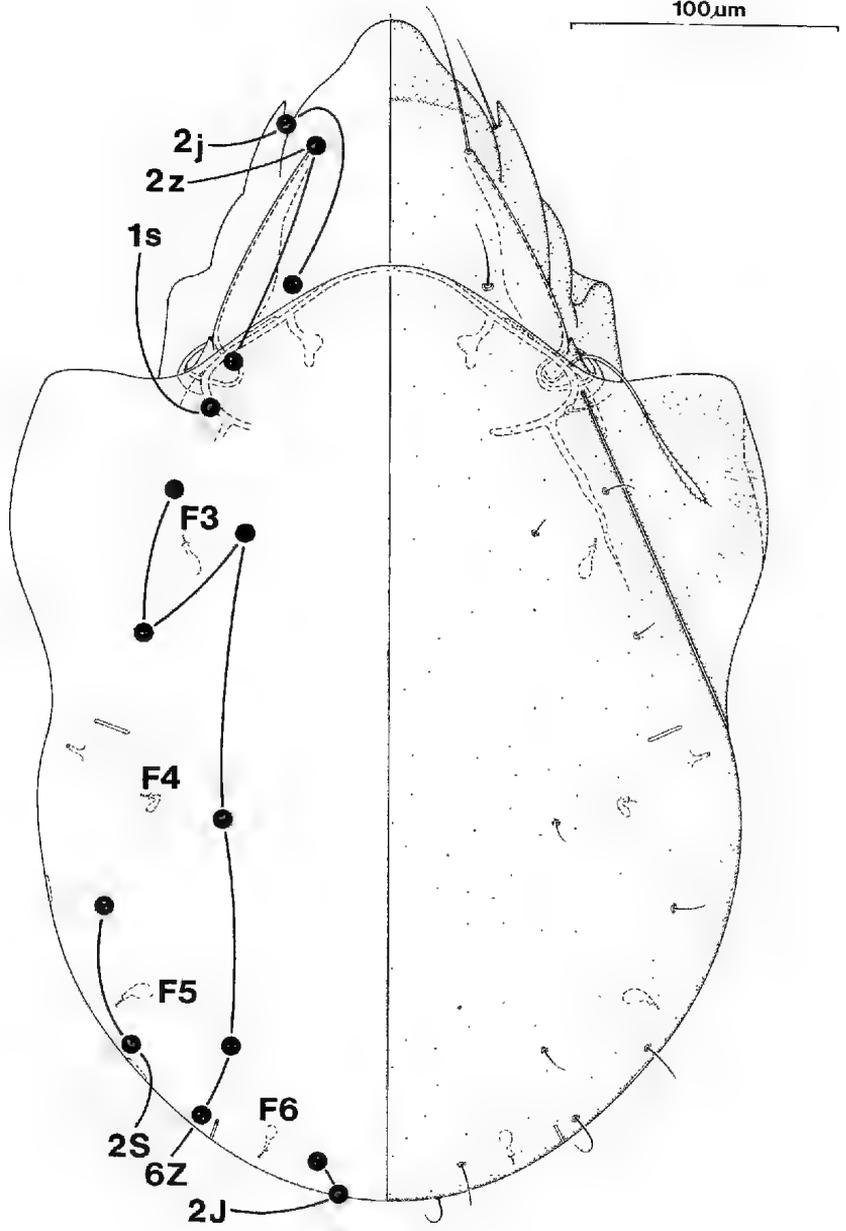
Discussion: The Haplozetidae comprised oripodoid genera with hinged pteromorphs. Balogh & Balogh (1984) further restricted the family to 18 genera with sacculate hysteronotal foramina, and recognised four subfamilies on the basis of the number of genital setae. This definition of subfamilies, however, is not consistent with all species within the genera *Haplozetes* Willmann, and *Lauritzenia* Hammer. Further, the keys provided by Balogh & Balogh (1984) are inconsistent in their treatment of pretarsal claws. *Haplozetes* and *Lauritzenia* are considered to be monodactyl, although some species of these genera have three pretarsal claws. These authors excluded *Magnobates* from the Oripodoidea without justification.

The new material examined here has three pretarsal claws and keys to *Incabates* by Balogh & Balogh's (1984) criteria. However, they differ from *Incabates* by the discidium being quadrangulate rather than triangulate, the proteronotal seta $\mu 1$ being lateral to seta $\alpha 1$ rather than in front of it, and the tuforium being laminar with a projecting anterior cusp rather than costate and without a cusp.

These character states of the new species are shared with *Haplozetes*, *Lauritzenia* and *Magnobates*, which are here regarded as an unnamed monophyletic group. They also share this group's synapomorphy of a hysteronotal foramen with a narrow refractile section of the duct near to its pore in the integument, usually accompanied by

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a hemispherical refractile plate. This is illustrated for *Haplozetes* by Beck (1964) and Grandjean (1936), and newly established as present on the holotype of the type species of *Lauritzenia* and *Magnobates* (*L. longipluma* Hammer, 1958 & *M. flagellifer* Hammer, 1967). It is further established that these two type species are similar to the new *Magnobates* species in having a long curved alveolus with the somal setal pores, three setae on genu II (v present) and a subrectangular discidium.

The reliable delineation of the three genera requires a thorough revision of the cosmopolitan *Haplozetes*, which may have four or five genital setae and one or three pretarsal claws. Initially, I here distinguish the two genera confined to southern temperate regions from *Haplozetes* by the presence of three setae on genu II, and from each other by the number of pretarsal claws (*Lauritzenia* with one claw, *Magnobates* with three claws). This requires the transfer of two species from *Lauritzenia*, as indicated in the remarks on *Magnobates*, leaving *Lauritzenia* (from South America) as monotypic.

Magnobates Hammer

Magnobates Hammer, 1967, p. 30 (type species by monotypy: *Magnobates flagellifer* Hammer, 1967); Hammer 1968, p. 72; Balogh 1972, p. 169; Luxton 1985, p. 63.

Lauritzenia Hammer, 1958 (part); Hammer 1968, p. 70.

Definition: Hysteronotum with 10 pairs (2I, 6Z, 2S) of setae and four pairs of normal (not fissuriform) sacculate foramina. Hysteronotal foramina with long, tubular sacculi and short, narrow refractile duct near integument; convex refractile hemispherical structure between these. Dorsosejugal furrow entire. Translamella and prelamella absent, conspicuous laminar tutorium (between setae $\beta 1$ - $\alpha 2$). Rosital seta ($\beta 1$) transposed laterally; beside rather than in front of seta $\alpha 1$. Pteromorph movable, with clear weakly sclerotized basal line. Discidium subrectangular, without custodium. Tibia I with large solenidium ($so 2$) on nearly flat dorsal surface, not tubercle, solenidium $so 1$ may or may not be on spur-like distodorsal tubercle; Tibia II with distodorsal spur. Genu II with three setae (v present). Tracheanter IV with distodorsal angle rounded and ridged, distoventral crown with only anterior angulate lobe, broad flange extending along entire venter of caput. Pretarsus with three claws, slimmer lateral claws with either ventral subterminal tooth or truncated tip.

General Morphology: Somal length range for adults: 330-1030. Somal chaetotaxy: 2j, 2z, 1s; 2J, 6Z, 2S; 3I, III, 3III, usually 3 (rarely 2) IV; usually 4 (rarely 5 or 6) JZg, 1Sg; 2JZu, 3Su. Leg chaetotaxy (solenidia in parentheses): I — 1, 5, 3 (1), 4 (2), 20 (2); II — 1, 5, 3 (1), 4 (1), usually 16 (rarely 15) (2); III — 2, 3, 1 (1), 3 (1), 15; IV — 1, 2, 2, 3 (1), 12. Alveolar canal of somal setae usually dilated and long, narrowing at internal extremity to refractile ring, sometimes twisted up to near cuticle, appearing like pore and sacculus near setal base, as described on *Magnobates acutirostrum* (Hammer, 1968) and *M. rotundirostrum* (Hammer, 1968). Pteromorph may lie close to the pleural surface (Fig. 6) or be lifted away from it (Fig. 5). Sub-bothridial flange present. Apodemes I, II, ventrosejugal and III present, with wide midsternal gap (greater than width of genital orifice) in ventrosejugal apodeme. Subpedal and circumpedal ridges merging into single continuous line. Proximoventral spur on tibiae I and II and distodorsal spur on tibia II. Femur I without caput collar. Conspicuous ventral flanges on femurs II and IV, on femur II margin angulate enclosing right angle.

Distribution: Australia (Aa) and New Zealand (An). The three species from New Zealand were either from lawn moss, a rotten branch or tree bark in the north of North Island, whilst in South Australia *Magnobates* was only recorded from the two moister sites that are in the savannah woodland and dry sclerophyll forest of the Mt Lofty Ranges. Within Australia, *Magnobates* may prove to be confined to the moister southern temperate regions.

Remarks: *Magnobates* was included in the Ceratozetoidea when it was established, but the placing by Balogh (1972) and Luxton (1985) in the Haplozetidae Grandjean, 1936 is followed with confidence, since *Magnobates* is very similar to *Haplozetes*, as already indicated here. Although *Magnobates* may prove to be a synonym of *Lauritzenia*, it is retained, using the only distinguishing character available, the number of pretarsal claws. This requires two species to be moved from *Lauritzenia* to be combined as in the list of *Magnobates* species. *Magnobates* includes five species as follows: *M. acutirostrum* (Hammer, 1968) comb. nov., *M. elongatus* sp. nov., *M. flagellifer* Hammer, 1967, *M. globulus* sp. nov., *M. rotundirostrum* (Hammer, 1968) comb. nov.

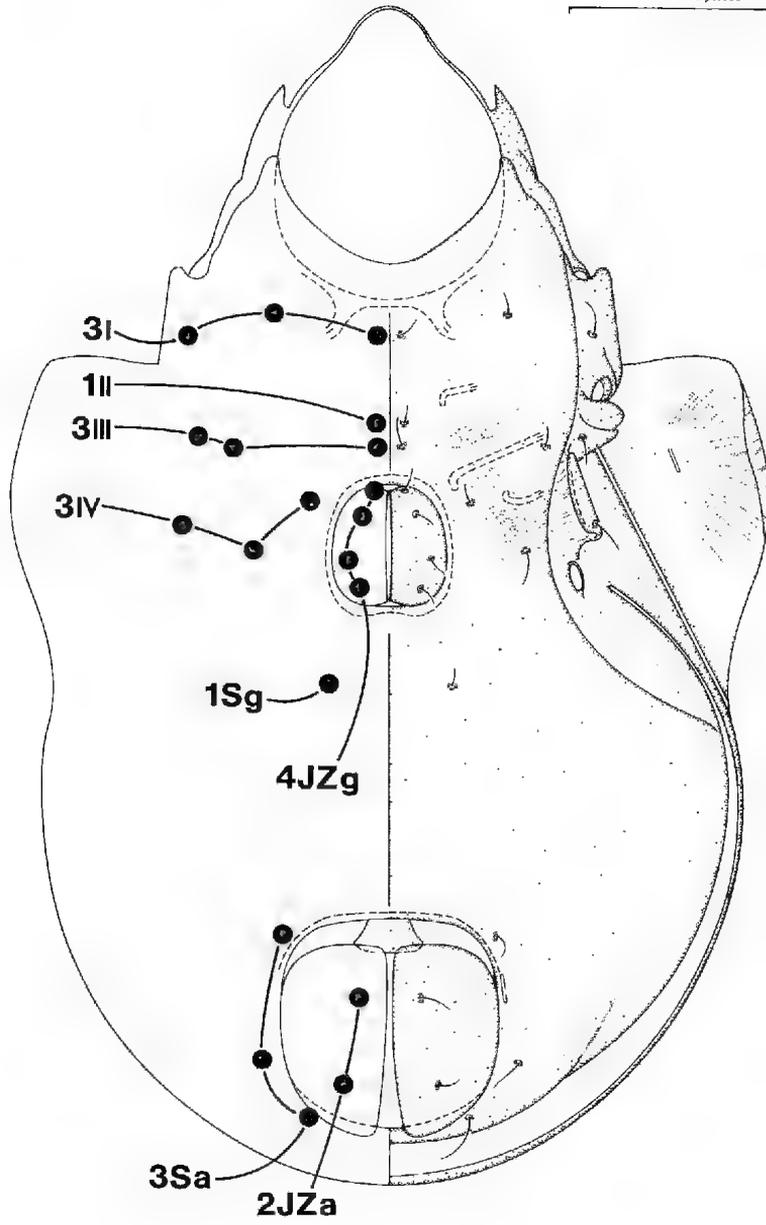
Key to *Magnobates* species (adults)

- 1 — Five or six pairs of genital setae (5 or 6/JZg). Lamella wide, dorsally; obscures tutorium

Fig. 1. *Magnobates elongatus* sp. nov. female, notum of soma.

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100µm



- behind seta z_12
- Four pairs of genital setae (4JZg) Lamella medium width, dorsally obscures tumrium only behind seta j_23
- 2 – Soma longer than 600 μm . Somal setae long (Z4 reaches S5, Sg longer than 0.5 \times genital shield).....*M. rotundirostrum* (Hammer)
- Soma shorter than 500 μm . Somal setae medium length (Z4 reaches halfway to S5, Sg shorter than 0.5 \times genital shield).....*M. acutirostrum* (Hammer)
- 3 – Soma longer than 900 μm . Sensory proteronotal seta z_2 tapering without caput.....*M. flagellifer* (Hammer)
- Soma shorter than 500 μm . Sensory proteronotal seta z_2 with weakly swollen fusiform caput.....4
- 4 – Sensory proteronotal seta z_2 with slim caput (greatest width less than 3 \times stalk width). Hysteronotal foramen F5 with spherical saccule. On tibia I, solenidium sol distal to so_2 and on tubercle.....*M. elongatus* sp. nov.
- Sensory proteronotal seta z_2 with medium width caput (greatest width more than 4 \times stalk width). Hysteronotal foramen F5 with T-shaped saccule. On tibia I, solenidium sol level with so_2 and not on tubercle.....*M. globulus* sp. nov.

Magnobates elongatus sp. nov.

FIGS 1–3

Type material: Holotype female (SAMA N1990242), plant litter, sparse moss and sandy soil, under sclerophyllous shrubs amongst mesquite stringybark (*Eucalyptus obliqua*), dry sclerophyll forest, near summit of Mt Lofty (34°59'S, 138°45'E), Cleland Conservation Park, 9.v.1974. Paratypes, eleven females (SAMA N1990243 – N1990250, 1–BMNH, 1–FMNH, 1–NZAC) and thirteen paratype males (SAMA N1990251 – N1990260, 1–BMNH, 1–FMNH, 1–NZAC), as holotype.

Female: Idiosomal length, 423, (I2, 401–437). Leg lengths (femur-tarsus for 434): I–204, III–175, II–161, IV–205. Tibial maximum heights (for 434): I–22, II–17, III–17, IV–17.

Proteronotum with lamellar margin straight, sub-linear. Bothridium (base of seta z_2) with normal,

short (less than 0.5 \times diameter of aperture) anterior process and small sub-bothridial flap. Seta j_1 , j_2 and z_1 smooth and slim, j_2 subequal in size to Z6. Sensory seta z_2 with slim fusiform caput, greatest width less than 3 \times width of stalk. Hysteronotum with some very short setae (Z2, Z3, Z4), not as long as fissure-like pore hf_3 . Foramina with globular saccules at end of short tubular ducts.

Idiosternal setae smooth, slim and short, I3 and Sa3 longest, seta III3 longer than III2, and IV3 present. Pedotectum II rounded distally, ventral ridge reaches posterior margin to form spur. No eggs observed.

Legs short (mean femur-tarsus length: 43% of somal length). On tibia I, solenidium sol nearly directly distal to so_2 and on distodorsal spur-like tubercle. Flange on femur I and II slightly bigger, and on trochanter IV slightly smaller, than on *Magnobates globulus*.

Male: Similar to female but idiosoma shorter, mean length, 392 (sclerophyll forest, 13, 380–403), 411.5 (savannah woodland, 1).

Referred material: Undesignated male (SAMA N1990261), grass, moss, leaf litter and loamy soil under manna gum trees (*Eucalyptus viminalis*), savannah woodland, Chambers Gully (34°58'S, 138°41'E), Cleland Conservation Park, 12.vi.1974.

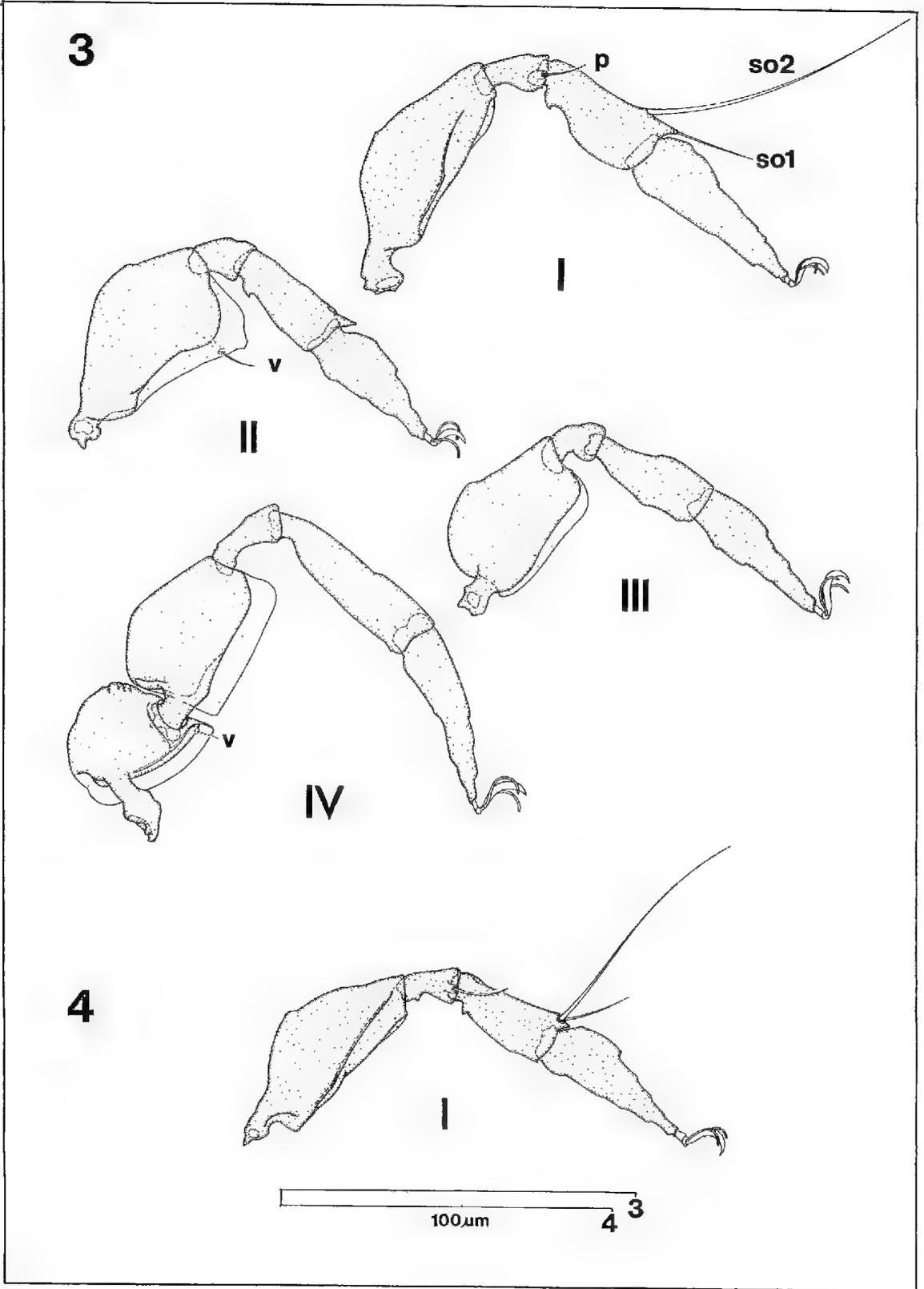
Remarks: The specific name *elongatus* is derived from the Latin 'prolonged' and refers to its idiosomal shape (when pteromorphs folded down) compared with *M. globulus*. It can be distinguished from the smaller two New Zealand species (*M. acutirostrum* and *M. rotundirostrum*) by having fewer genital setae, a narrower lamella and slim smooth proteronotal setae and from *M. flagellifer* by being smaller. The slimness of the proteronotal setae and shortness of seta j_2 is unique within *Magnobates*, but a short seta j_2 is found on *Lauritzenia longiphuma* Hammer, 1958, which also has solenidium sol of tibia I on a dorsodistal tubercle.

Magnobates globulus sp. nov.

FIGS 4–6

Type Material: Holotype, female (SAMA N1990262), grass, moss, leaf litter and loamy soil under manna gum trees (*Eucalyptus viminalis*), savannah woodland, Chambers Gully (34°58'S, 138°41'E), Cleland Conservation Park, 12.vi.1974. Paratypes, two females (SAMA N1990263, N1990264) and one male (SAMA N1990265), as holotype.

Fig. 2. *Magnobates elongatus* sp. nov., female, sternum of soma.



Female: Idiosomal length, 341 (3, 336–347). Leg lengths (femur-tarsus for 336: I–167, II–149, III–145, IV–176. Tibial maximum heights (for 336): I–17, II–13, III–12, IV–13.

Proteronotum with lamellar margin curved, convex. Bothridium (base of seta z2) with long (as long as diameter of aperture) anterior process and large sub-bothridial flap. Setae j1, j2 and z1 ciliate and stout, j2 unlike Z6. Sensory seta z2 with robust clavate caput, greatest width more than 4 × width of stalk. Hysteronotal setae short but all longer than fissure-like pore h/3. Foramina with small globular saccules at end of ducts, except F5 where saccule T-shaped.

Idiosternal setae often smooth, slim and short, but midsternal coxite setae (files 1 and 2) stouter and clearly ciliate, and III and IIII as long as or longer than I3 and Sv3. Setae III3 shorter than all others, IV3 absent. Pedotectum II flat distally, ventral ridge not forming spur on posterior margin. Eggs ellipsoidal, exochorion smooth, 129 × 86–136 × 57 (for 337 only, other two females without eggs).

Legs medium-length (mean femur-tarsus: 47% of somal length) and tibiae medium-height (mean maximum height: 36% of mean length). On tibia I, solenidium sol nearly directly in front of so2, both on flat dorsal surface, not on spur. Flanges on femur I and III slightly smaller, and on trochanter IV slightly bigger, than on *Magnobates elongatus*.

Male: Similar to female but idiosoma shorter, 332.

Remarks: The specific name *globulus* is derived from the Latin for 'bead' or 'small ball', referring to its globular shape when its pteromorphs are folded down, unlike *M. elongatus*. It is the smallest known species of *Magnobates*. The globular shape and the stouter ciliate proteronotal setae are similar to those of *M. acutirostrum*, *M. flagellifer* and *M. rotundirostrum*, and these character states may be primitive. The disposition of the solenidia on tibia I also is common within the Oripodoidea. The unusual T-shaped saccule of foramen F5 is unique within *Magnobates*, but is similar to that of *Lauritzenia longipluma* Hammer, 1958 and some species of *Haplozetes* (Beck 1964; Grandjean 1936).

Acknowledgments

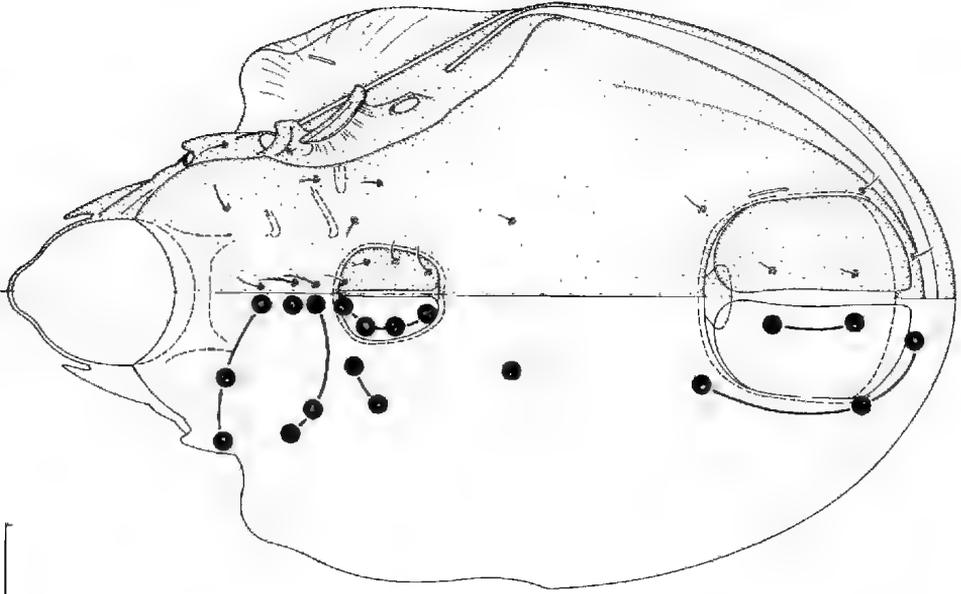
We are indebted to the Australian Biological Resources Study for funding the salary of K.J.S. in a grant to D.C.L., as well as to Dr Henrik Enghoff (Zoological Museum, Copenhagen) for making two types available. Thanks are also due to Ms Kirstie Jamieson for the notation and presentation of the figures and Mrs Debbie Lowery for typing the manuscript.

References

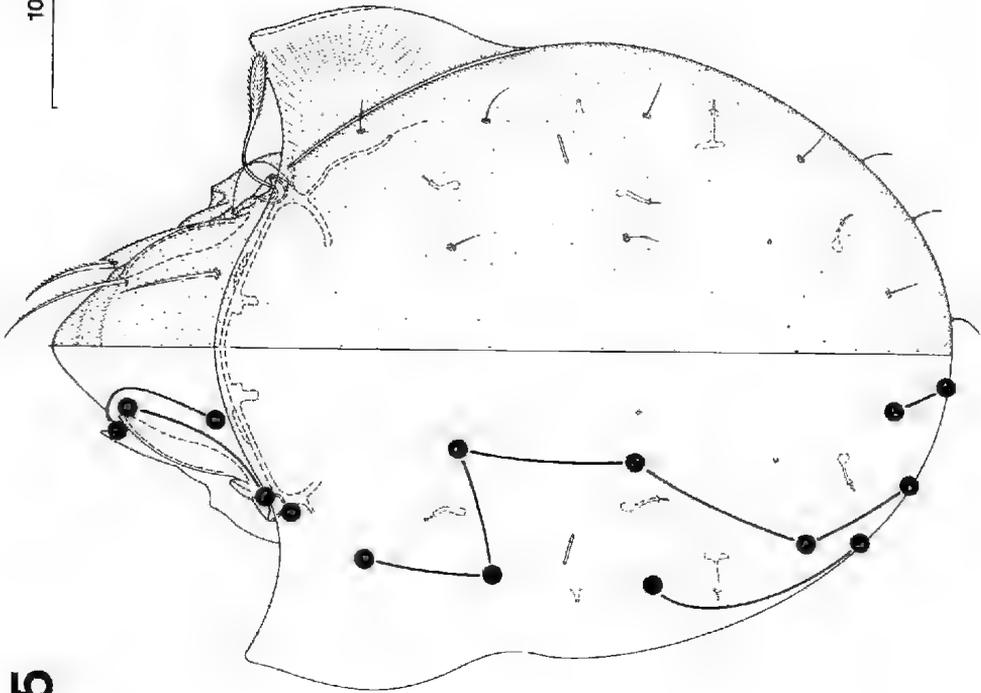
- BALOGH, J. (1972) 'The Oribatid Genera of the World.' 'Akadémiai Kiadó, Budapest).
- & BALOGH, P. (1984) Review of the Oribatulodea Thor, 1929 (Acari: Oribatei). *Acta zool. hung.* 30, 257–313.
- BECK, L. (1964) Beiträge zur Kenntnis der neotropischen Oribatidenfauna 4. *Haplozetes* und *Peloriobates* (Arach., Acari). *Senckenberg biol.* 45, 161–183.
- GRANDJEAN, F. (1936) Observations sur les Oribates (Oribatei). *Bull. Mus. natn. Hist. natur., Paris* (2) 8, 246–253.
- HAMMER, M. (1958) Investigations on the oribatid fauna of the Andes Mountains. I. The Argentine and Bolivia. *Biol. Skr.* 10(1), 1–129, 34 pls.
- (1967) Investigations on the oribatid fauna of New Zealand, Part II, *Ibid.* 15(4), 1–64, 40 pls.
- (1968) Investigations on the oribatid fauna of New Zealand, Part III, *Ibid.* 16(2), 1–96, 30 pls.
- LEE, D. C. (1987) Introductory study of advanced oribatid mites (Acarida: Cryptostigmata: Planofissurae) and a redescription of the only valid species of *Constrictobates* (Oripodoidea). *Rec. S. Aust. Mus.* 21, 35–42.
- LUXON, M. (1985) Cryptostigmata (Arachnida: Acari) – a concise review. *Fauna N.Z.* 7, 1–106.
- WILLMANN, C. (1935) Faunistisch-ökologische Untersuchungen im Anningergebiet IV. Die Milbenfauna. I. Oribatei. *Zool. Jb. Syst.* 66, 331–344.

Figs 3–4. *Magnobates*, posterior aspect of right legs. 3, *M. elongatus* sp. nov., legs I–III (femur-pretarsus), leg IV (trochanter-pretarsus); 4, *M. globulus* sp. nov., leg I (femur-pretarsus). Only setae represented are posterior seta on genu I, two solenidia on tarsus I, ventral seta on femora II (only seta v2), IV and trochanter IV.

6



5



Figs 5-6. *Magrobates globulus* sp.nov., female. 5, notum of soma; 6, sternum of soma.